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Three Years' Work of the Ferndale (Humboldt County) Cow Testing Association

BY

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COW TESTING ASSOCIATIONS.

OBJECT.

The cow testing association is a plan of coöperation among dairymen for the purpose of regularly and economically testing their cows for production of milk and butter fat. There is no data showing the average production of cows in California. A usual estimate places it at 175 pounds of butter per cow per year. In these days people who are familiar with dairying think in terms of butter fat, and if the above average be translated to fat it makes about 150 pounds. At 30 cents per pound, which has been the average price for the past three years, the annual income per cow is \$45.00. Possibly a cow can be kept for this amount in some parts of the State, as for instance on the hill ranges of the coast, but in other sections the cost is known to be greater.

If the above figures are taken as a foundation, it is very apparent that there are many cows in the State which are not paying the cost of their keeping. The average production might be even greater and still there would be many cows not yielding a profit, for with a higher average there must be cows producing 100 to 125 pounds of butter to offset those giving from 300 to 400 pounds which are known to exist because of actual tests. Suffice it to say that the use of the scales and the Babcock test has discovered in every herd tested some cows that do not pay cost of keeping. These robbers must be apprehended, if dairying is to be made as profitable a business as it ought to be and as it has a right to be under proper management.

There is no means of knowing what a cow is producing without weighing and testing her milk at regular intervals. A dairyman selling milk by volume may not be concerned in the butter fat content further than is necessary to keep up to legal standard, but one who is selling butter fat is vitally concerned in the amount of fat each cow produces. Since the great majority are selling butter fat, the question of fat content becomes one of statewide financial importance. Each dairyman may test his own cows, but facing the condition squarely it is known that very few do. At a dairyman's meeting a few months since, this point was raised — that a testing association was unnecessary because each individual could test his own cows. The question was then asked: "How many present have Babcock testers?" About twelve out of a gathering of fifty responded in the affirmative. The next question was: "How many of you who have Babcock testers use them?" Only one answered in the affirmative. This represents conditions quite as they are found universally. The majority of dairymen do not own

a Babcock tester and of those who do own one, about one in twelve uses it.

The object of cow testing associations is to make the use of scales and Babcock machine a community affair—to unite the dairymen into a partnership for the purpose of employing a trained man to visit each herd at regular monthly intervals and weigh and test the milk of each cow. At the end of the year, this man gives each dairyman a record of the individuals in his herd with little work or trouble to him and at a cost of about one dollar per cow.

HISTORY.

Cow testing associations originated in Denmark in 1895, in which year two organizations were formed. They were so successful in that country that the movement soon spread to other European countries where dairying is a prominent industry. In 1909 the number of associations is given as follows:* Denmark 530, Germany 207, Sweden 662, Norway 146, Finland 99, Russia 52, Scotland 13.

The first association in the United States was organized at Fremont, Michigan, in 1905, by Helmer Rabild, now in charge of Dairy Farming Investigations in the Bureau of Animal Industry, Washington, D. C. This association had 31 members and 239 cows completed the first year's test. Since that time similar associations have been organized in practically all of the leading dairy states.

California has three associations in active operation. The first one was organized in 1909 in Humboldt County by Mr. C. L. Mitchell, then Dairyman with the United States Department of Agriculture. This is called the Ferndale Cow Testing Association and its records from the basis of this bulletin. Two others were organized by the assistance of the writer early in the present year—one at Modesto, known as the Stanislaus Cow Testing Association, and the second at Tulare, known as the Tulare Cow Testing Association.

ORGANIZATION.

Any community in which dairying is a leading industry may usually form a cow testing association. The number of cows represented in California associations varies from 700 to 1,300 and the membership varies from twenty-two to thirty dairymen. Theoretically, there should be twenty-six members, since there are twenty-six working days in the month, and an average of about forty cows in each dairy. In practice, the number of cows is the most important element and the number of members is easily adjusted. In a community, therefore, where the requisite number of cows is owned within a radius of three to five miles,

*Circular 179. Bureau of Animal Industry, U. S. Department of Agriculture—Cow Testing Associations.

the dairymen should take steps to form an association. This bulletin is meant to give necessary directions and helps, and the writer will gladly respond to correspondence for further information or for personal assistance in the field. The University believes firmly in the usefulness of cow testing associations, and will do everything within its means to aid in their extension.

A temporary organization may be effected in the beginning by appointing a committee to draw up a form of contract and secure signatures. The initiative may be taken by the dairymen themselves, or by any farmers' organization that is in existence in the community, such as the Grange or the Farmers' Educational and Coöperative Union. The attention of such organizations is urgently directed toward cow testing associations as a very practical means of attaining some of the objects for which they are working. Coöperative creameries and creamery companies ought also to be foremost in promoting testing associations among their patrons.

As soon as enough members have been secured to assure the success of an association a meeting of the signers should be called. At this meeting the permanent organization is perfected. Officers are elected, usually three, consisting of president, vice-president, and secretary-treasurer. In addition to these two or four members are chosen to act with the three officers as a board of directors and by-laws are adopted for the government of the association. Copies of contracts and by-laws will be found in the appendix of this bulletin.

THE TESTER AND HIS WORK.

The most important man in an association is the one who weighs and tests the milk and keeps the records—or the tester, as he is known. He is engaged by the board of directors and works under their direction—or more immediately under the secretary who is the association's executive officer. The tester should be a man of fairly mature years and of some technical training. It is better, also, if he has had some practical dairy experience. The usual wage for the tester in California is sixty dollars per month in addition to board and lodging. He is also provided with a horse and wagon to convey himself and his testing outfit from dairy to dairy. He and his horse are provided for at the ranch where he is working.

The tester visits each dairy one day in each month. He weighs and samples the milk of each cow at the evening and morning milking and tests the combined sample for butter fat. The amount of milk and fat produced in the twenty-four hours multiplied by the number of days in the month is taken as the cow's monthly production. Before leaving the dairy, the tester makes the calculations so that he may

leave with the dairyman the record of each cow down to date. If there are more cows in one herd than he can test in one day he weighs and samples from all the first day and takes a second day to complete the tests and records. The accompanying page shows a style of record in use in California. Each page may contain a cow's record for the entire year. The dairyman has a copy and the tester or secretary of the association keeps a copy.



FIG. 1.—The tester at work, Ferndale.

The testing outfit consists of a twenty-four bottle hand Babcock tester with necessary glassware, sample bottles, spring balances, milk pail for weighing, and appliances for heating water. The spring balance should have two pointers, one adjustable so that it may be set at zero with the pail on. The balances should be graduated to tenths of a pound instead of ounces. A very convenient form of sample bottle is one $6\frac{1}{2}$ inches high and $1\frac{1}{2}$ inches inside diameter. It is the same size from top to bottom and has a large cork on the top of which may be carved the number. Detailed lists may be found in the appendix of this bulletin.

In European countries and in the eastern states one of the duties of a tester is to weigh and keep a record of food consumed by the cows. This has not yet been done in California. Such a large portion of dairy feeding in this State is in pasturage that the tester has not been called upon to make any calculations of food cost. On this account he is able to test more cows than is usual in other states. California dairymen should know the cost of feed, and it is hoped that in the near future this may also become an object of organized research.

THE COST.

The charge to the dairyman for testing varies in California from 80 cents to \$1.50 a year for each cow. This variation is due to the number of cows in the associations and to the size of individual herds. The Ferndale Association, which has over 1,200 cows, charges 80 cents to all members having 50 or more cows tested, and \$1.00 per cow to members having less than 50 cows. The Stanislaus Association with 700 cows charged \$1.50 per cow, because it was necessary in order to have sufficient funds to operate the association. The Tulare Association had more cows than Stanislaus and charged \$1.25 per cow. Additional details may be found in the contracts in the Appendix. The following items of expense need to be considered in forming an association:

Estimated Expenses for First Year.

Salary of tester, 12 months at \$60-----	\$720 00
Testing outfit (approximately) -----	75 00
Sulfuric acid, 6 carboys at about \$3.50-----	21 00
Printing and binding record blanks (1,000 in duplicate) and tester's dairy sheets -----	25 00
Horse and buggy for use of tester-----	250 00
Total -----	<hr/> \$1,091 00

The testing outfit and sulfuric acid are usually purchased from one of the dairy supply houses in San Francisco or Los Angeles. The printing is done by the local printer. It is best to have the record sheets bound into books of varying sizes to accommodate the size of herds.

Age _____ Years

NAME _____ No. _____

Date of Calving _____, 19 _____ Date of Going Dry _____, 19 _____

Date of Service _____, 19 _____ Name of Bull _____

TEST MADE.	Lbs. Milk.	Test.	Butter Fat.	Price.	Receipts for Fat.	Receipts for S. M.	Total Receipts.	Expense.	Net Profit.	Net Loss.	REMARKS.
March											
April											
May											
June											
July											
August											
September											
October											
November											
December											
January											
February											
Total for year											

Description of Cow _____ Breed _____

Description of Calf _____ Sire _____ No. _____



FIG. 2.—Betsie. Jersey, Holstein, and Shorthorn blood. Herd No. 8. Highest fat production in 1911 in Ferndale Association.

Year.	Months in milk.	Pounds milk.	Pounds fat.
1909 -----	9	9,463	485.4
1910 -----	9	10,119	483.5
1911 -----	11	12,644	609.7
Average -----		10,742	526.2

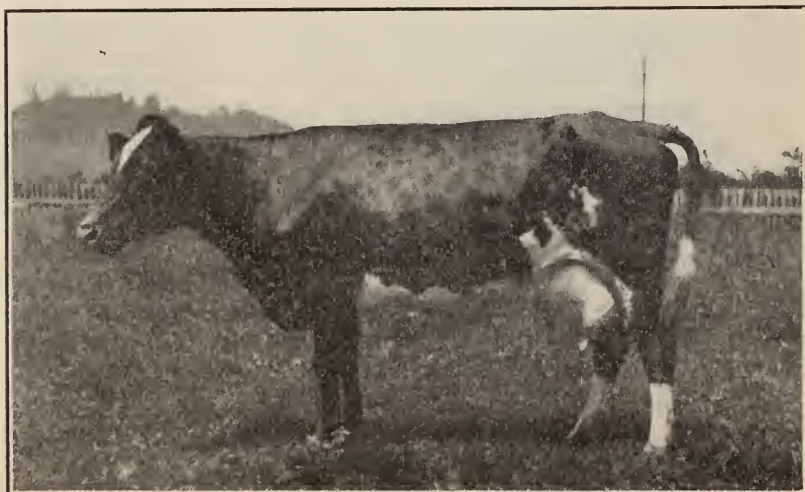


FIG. 3.—Mini. Grade Shorthorn. Highest record for milk production in 1911 in Ferndale Association, 14,071 pounds of milk; 460.7 pounds of fat.

THREE YEARS' RECORD OF THE FERNDALE COW TESTING ASSOCIATION.

Through the courtesy of officers and members of the Ferndale Association, the writer has been given access to the records of the association since its organization in the winter of 1909. Eight* members have been in the association from the beginning and the records of their herds have been studied to learn the results of testing according to the plan described in the foregoing pages. These herds comprise approximately 600 cows or about one half the total number under test each year. All calculations have been checked and verified so that it is safe to say all mechanical errors have been eliminated. That few errors were found bears witness to the careful work of those who have occupied the position of tester in the Ferndale Association.

The Eel River lands near the ocean in Humboldt County will be recalled as one of the most highly specialized dairy sections in the State. The soil is rich and usually well watered by a generous rainfall, and the ground water is not many feet from the surface. Such pasture grasses as rye grass and white clover grow luxuriantly during the late winter, spring and early summer, and at those seasons grazing affords the only feed. As the pastures begin to dry, the cows are fed roots, beginning with a few turnips and following with carrots and beets. The fall and winter feed consists of hay supplemented by roots so far as possible to cows that are in milk. The usual hay crop is of Italian rye grass and red clover, but in later years red clover has not produced well. Alfalfa is grown only in small quantities. These excellent feed conditions have had great influence in developing Humboldt county dairy cows and in producing the high average yield of butter fat shown in the accompanying records.

The rolling and hilly lands to the south and east of the Eel River bottoms are likewise devoted to dairying. Here the pasturing season is shorter and on many ranches the grasses are not so luxuriant. More supplementary feeding is, therefore, practiced and grains are more apt to be found as a part of the ration. Little if any grain is fed in the dairies on the bottom lands.

Owing to heavy rains in the winter season it is the custom to have most of the cows dry at that time. Thus, during the first three years of the testing association, the records began March 15th. The tendency seems to be, however, to begin the testing year at an earlier date and in 1912 it was set at February 15th. The records as summarized in this bulletin contain lactation periods of six months or over. All

*Advance press reports gave the number of members as nine. Since one member was in the association but two years, 1910 and 1911, it has been thought best not to include his herd.

records of cows having a lactation period of less than six months are not included.

The records of the cows belonging to the eight members of the Fern-dale Association are summarized in Tables I and II.

TABLE I. *Total and Average Production of Eight Herds Arranged by Years.*
1909.

Herd number.	Number of cows.	Total pounds milk.	Average pounds milk.	Total pounds fat.	Average pounds fat.
1 -----	76	505,539	6,652	27,258.2	358.6
2 -----	68	382,584	5,626	13,953.8	205.2
3 -----	47	299,474	6,372	15,198.9	323.4
4 -----	123	724,349	5,889	27,975.1	227.4
5 -----	74	356,488	4,817	14,208.6	192.0
6 -----	119	677,904	5,697	25,956.5	218.1
7 -----	44	285,107	6,480	11,276.4	256.3
8 -----	30	196,326	6,544	10,022.3	334.1
Average -----	581	-----	5,900	-----	251.0

1910.

Herd number.	Number of cows.	Total pounds milk.	Average pounds milk.	Total pounds fat.	Average pounds fat.
1 -----	69	460,007	6,667	23,913.9	346.5
2 -----	69	435,324	6,309	16,888.8	244.8
3 -----	56	333,220	5,950	16,417.5	293.2
4 -----	121	858,031	7,091	33,845.9	279.7
5 -----	84	549,336	6,540	22,367.4	266.3
6 -----	134	788,868	5,887	31,276.4	233.4
7 -----	34	238,439	7,013	9,859.8	290.0
8 -----	34	232,899	6,850	11,896.1	349.9
Average -----	601	-----	6,483	-----	277.0

1911.

Herd number.	Number of cows.	Total pounds milk.	Average pounds milk.	Total pounds fat.	Average pounds fat.
1 -----	80	521,065	6,513	27,639.9	345.5
2 -----	67	454,532	6,784	17,402.2	259.7
3 -----	57	309,440	5,428	15,261.9	267.7
4 -----	123	932,684	7,583	37,094.8	301.6
5 -----	73	481,332	6,593	19,084.2	261.4
6 -----	140	959,127	6,851	36,685.6	262.0
7 -----	36	294,513	8,181	12,086.5	335.7
8 -----	33	243,691	7,384	12,284.0	372.2
Average -----	609	-----	6,890	-----	291.5



FIG. 4.—Selma. Grade Shorthorn. Herd No. 2.

Year.	Age.	Months in milk.	Pounds milk.	Pounds fat.
1910 -----	3	9	4,703	155.2
1911 -----	4	10	7,787	250.4
Average -----			6,245	202.8



FIG. 5.—Jacob. Grade Shorthorn. Herd No. 2.

	Months in milk.	Pounds milk.	Pounds fat.
1910 -----	10	9,913	368.6
1911 -----	10	11,015	415.3
Average -----		10,464	392.0



FIG. 6.—Jennie. Grade Shorthorn. Herd No. 8. A type of cow of which there are many in Humboldt County.

Year.	Age.	Months in milk.	Pounds milk.	Pounds fat.
1909 -----	6	9	9,765	391.0
1910 -----	7	10	11,119	427.7
1911 -----	8	11	11,505	445.2
Average -----			10,796	421.3



FIG. 7.—Queen. High Grade Jersey. Herd No. 8.

Year.	Age.	Months in milk.	Pounds milk.	Pounds fat.
1909 -----	3	9	6,342	332.5
1910 -----	4	10	10,077	548.5
1911 -----	5	11	7,378	376.6
Average -----			7,932	419.2

TABLE II. *Summary of Average Production for each Year.*

Year.	Number of cows.	Average pounds milk.	Average pounds fat.	Gain pounds fat.
1909 -----	581	5,900	251.0	
1910 -----	601	6,483	277.0	26.0
1911 -----	609	6,890	291.5	14.5

The record shows a total gain of approximately 40 pounds of fat per cow in 1911. At 30 cents per pound this is an average gain of \$12.00 per cow. If the cost of testing is put at \$1.00 per cow per year, this shows a net gain of \$9.00. In other words, the dairyman has made \$4.50 per cow per year during 1910 and 1911 above the total cost of testing, from the knowledge which the testing gave him of his herd.

If this gain of \$4.50 were possible with eight dairymen and 600 cows, it might have been possible with the 10,000 cows which are said to be in the Ferndale district. In that case there would have been an annual net increase of \$45,000 distributed in the district during the years of 1910 and 1911.

The annual rainfall for the past three years has an important bearing upon the interpretation of the records. The precipitation of 1909 was 5.75 inches above normal, while that of 1910 and 1911 was 16.24 inches and 16.04 inches, respectively, below normal. In spite of the great decrease in rainfall during the last two years and its resultant effect upon grazing and feed conditions in general, the average production of milk and fat increased. Two herds, however, show a decrease in production as will be seen by reference to Table III. Herd No. 3 is situated on rolling land where lack of rainfall is most felt and shortage of feed seems to be chiefly responsible for the decrease in production. Herd No. 1 is situated partly on low land and partly on rolling land. Herd No. 5 shows a decrease of five pounds of fat per cow from 1910 to 1911, but since there was an increase of 74.3 pounds in 1910 over 1909, there is evidence of wise selection on basis of the test. This herd and likewise No. 6 are on the bottom lands but heifers are added to them frequently from hill ranges. After testing for a year or two they are kept or turned to beef according to their production. This practice tends toward a proportionately large number of low producers.

In Table III the production of each herd and the number of cows producing more or less than 200 pounds of fat are given. This is on the basis that 200 pounds at 30 cents per pound is necessary to pay total cost of keeping a cow.

TABLE III. *Production of Each of Eight Herds during Three Years.*
Herd Number 1.

Year.	Number of cows.	Total pounds milk.	Average pounds milk.	Total pounds fat.	Average pounds fat.	Gain or loss at 30 cents per pound for fat.
1909 -----	76	505,539	6,652	27,258.2	358.6	-----
1910 -----	69	460,007	6,667	23,913.9	346.5	-\$3 63
1911 -----	80	521,065	6,513	27,639.9	345.5	— 30
Average ----	225	-----	6,607	-----	350.2	-\$3 93

	1909.	1910.	1911.
Number in this herd producing more than 200 pounds of fat-----	70	67	74
Number in this herd producing less than 200 pounds of fat-----	6	2	6
Highest individual production of fat, pounds--	626.9	531.9	591.9
Lowest individual production of fat, pounds--	162.2	192.8	148.0

Herd Number 2.

Year.	Number of cows.	Total pounds milk.	Average pounds milk.	Total pounds fat.	Average pounds fat.	Gain or loss at 30 cents per pound for fat.
1909 -----	68	382,584	5,626	13,953.8	205.2	-----
1910 -----	69	435,324	6,309	16,888.8	244.8	+\$11 88
1911 -----	67	434,532	6,784	17,402.2	259.7	+ 4 47
Average ----	204	-----	6,237	-----	236.4	+\$16 35

	1909.	1910.	1911.
Number in this herd producing more than 200 pounds of fat-----	37	56	55
Number in this herd producing less than 200 pounds of fat-----	31	13	12
Highest individual production of fat, pounds--	306.4	369.8	415.3
Lowest individual production of fat, pounds--	99.4	93.3	124.1

Herd Number 3.

Year.	Number of cows.	Total pounds milk.	Average pounds milk.	Total pounds fat.	Average pounds fat.	Gain or loss at 30 cents per pound for fat.
1909 -----	47	299,474	6,372	15,198.9	323.4	-----
1910 -----	56	333,220	5,950	16,417.5	293.2	-\$9 06
1911 -----	57	309,440	5,428	15,261.9	267.7	— 7 65
Average ----	160	-----	5,888	-----	293.0	-\$16 71

	1909.	1910.	1911.
Number in this herd producing more than 200 pounds of fat-----	46	50	50
Number in this herd producing less than 200 pounds of fat-----	1	6	7
Highest individual production of fat, pounds--	434.3	421.5	372.6
Lowest individual production of fat, pounds--	194.7	132.6	137.2

Herd Number 4.

Year.	Number of cows.	Total pounds milk.	Average pounds milk.	Total pounds fat.	Average pounds fat.	Gain or loss at 30 cents per pound for fat.
1909 -----	123	724,349	5,889	27,975.1	227.4	-----
1910 -----	121	858,031	7,091	33,845.9	279.7	+\$15 69
1911 -----	123	932,684	7,583	37,094.8	301.6	+ 6 57
Average ----	367	-----	6,853	-----	269.5	+\$22 26

	1909.	1910.	1911.
Number in this herd producing more than 200 pounds of fat-----	83	103	111
Number in this herd producing less than 200 pounds of fat-----	40	18	12
Highest individual production of fat, pounds--	378.0	487.9	481.0
Lowest individual production of fat, pounds--	114.3	125.1	109.1

Herd Number 5.

Year.	Number of cows.	Total pounds milk.	Average pounds milk.	Total pounds fat.	Average pounds fat.	Gain or loss at 30 cents per pound for fat.
1909 -----	74	356,488	4,817	14,208.6	192.0	-----
1910 -----	84	549,336	6,540	22,367.4	266.3	+\$22 29
1911 -----	73	481,332	6,593	19,084.2	261.4	- 1 47
Average ----	231	-----	6,005	-----	241.0	+\$20 82

	1909.	1910.	1911.
Number in this herd producing more than 200 pounds of fat-----	30	69	67
Number in this herd producing less than 200 pounds of fat-----	44	15	7
Number of 2 and 3 year old heifers in herd-----	22	20	11
Highest individual production of fat, pounds--	469.8	476.2	383.0
Lowest individual production of fat, pounds--	83.4	113.4	159.9

Herd Number 6.

Year.	Number of cows.	Total pounds milk.	Average pounds milk.	Total pounds fat.	Average pounds fat.	Gain or loss at 30 cents per pound for fat.
1909 -----	119	677,904	5,697	25,956.5	218.1	-----
1910 -----	134	788,868	5,887	31,276.4	233.4	+ \$4 59
1911 -----	140	959,127	6,851	36,685.6	262.0	+ 8 58
Average ----	393	-----	6,173	-----	238.9	+\$13 17

	1909.	1910.	1911.
Number in this herd producing more than 200 pounds of fat-----	67	85	104
Number in this herd producing less than 200 pounds of fat-----	52	49	36
Highest individual production of fat, pounds--	387.1	405.5	430.5
Lowest individual production of fat, pounds--	90.0	89.2	49.0

Herd Number 7.

Year.	Number of cows.	Total pounds milk.	Average pounds milk.	Total pounds fat.	Average pounds fat.	Gain or loss at 30 cents per pound for fat.
1909 -----	44	285,107	6,480	11,276.4	256.3	-----
1910 -----	34	238,439	7,013	9,859.8	290.0	+\$10 11
1911 -----	36	294,513	8,181	12,086.5	335.7	+ 13 71
Average ----	114	-----	7,176	-----	291.4	+\$23 82

	1909.	1910.	1911.
Number in this herd producing more than 200 pounds of fat.-----	34	29	36
Number in this herd producing less than 200 pounds of fat.-----	10	5	0
Highest individual production of fat, pounds..	416.0	428.2	471.8
Lowest individual production of fat, pounds..	148.6	172.2	211.6

Herd Number 8.

Year.	Number of cows.	Total pounds milk.	Average pounds milk.	Total pounds fat.	Average pounds fat.	Gain or loss at 30 cents per pound for fat.
1909 -----	30	196,326	6,544	10,022.3	334.1	-----
1910 -----	34	232,899	6,850	11,896.1	349.9	+ \$4 74
1911 -----	33	243,691	7,384	12,284.0	372.2	+ 6 69
Average ----	97	-----	6,937	-----	352.6	+\$11 43

	1909.	1910.	1911.
Number in this herd producing more than 200 pounds of fat.-----	27	33	33
Number in this herd producing less than 200 pounds of fat.-----	3	1	0
Highest individual production of fat, pounds..	553.4	548.5	609.7
Lowest individual production of fat, pounds..	191.1	184.2	212.3



FIG. 8.—Lulu. High Grade Jersey. Herd No. 8.

Year.	Age.	Months in milk.	Pounds milk.	Pounds fat.
1909 -----	3	9	6,082	394.7.
1910 -----	4	11	7,128	453.1
1911 -----	5	11	8,753	542.7
Average -----			7,321	463.5



FIG. 9.—Jane. High Grade Jersey.

Year.	Age.	Months in milk.	Pounds milk.	Pounds fat.
1910 -----	6	11	9,515	531.6
1911 -----	7	10	8,597	531.5
Average -----			9,056	531.5

Herds numbers 1, 2, 3, 7 and 9 are headed by pure bred Jersey bulls. Herd No. 4 is headed by pure bred Guernsey bulls. Herds 5 and 6 are headed by good bulls, but of not so direct a line of breeding. In some of the herds using pure bred bulls (in most cases registered) the work of grading up has been in progress a number of years. For instance, it is said that the improvement in herd No. 1 has been going on for twenty years. The result is marked in the average yield of butter fat

for three years of 350 pounds per cow. This is excelled by only one herd, No. 8, a much smaller herd and one also in which a pure bred sire has been used many years. Financial returns are amply paying for all the time and thought put into improvement in these herds, which are still grade herds with comparatively few registered cows. The foundation cows were large animals of Shorthorn or "Durham" blood similar to those shown in Figures 5 and 6.

Herd No. 2 in 1911 with 67 cows produced 3448.4 pounds more butter fat than it produced in 1909 with 68 cows.

Herd No. 4 contained the same number (123) of cows in 1911 as in 1909 but produced in the later year 9119.7 pounds more of butter fat.

Herd No. 5 in 1911 with 73 cows produced 4875.6 pounds more of butter fat than it produced in 1909 with 74 cows. This herd has the greatest average increase in one year, viz., 1910 over 1909—74.3 pounds of fat.

Herd No. 7 in 1911 with eight less cows than in 1909 produced 810 pounds more of butter fat. This herd has the greatest average increase in two years, viz., 1911 over 1909—79.4 pounds of fat. The detailed record of each cow is given on page 476.

Attention is especially called to herd No. 8—beginning in 1909 with 30 cows and an average fat production of 334 pounds — increasing in 1910 by 15.8 pounds with 34 cows and again in 1911 by 22.2 pounds with 33 cows. With fat at 30 cents per pound the average production of 352.6 pounds during three years is an average annual income per cow of \$105.78. It is hoped that the reader will apply the financial test to all the gains in production in these herds, in order that he may fully realize the value of combining pure bred sires with a systematic testing of each cow.



FIG. 10.—Olga's Champion 97895 A. J. C. C. A type of sire heading some of the dairy herds in Humboldt County.

TABLE IV. *Individual Record of Herd No. 7 for Three Years, with notes as to disposition of cows in so far as the testing record shows.*

Name of cow.	Age.	1909.			1910.			1911.		
		Months in milk.	Pounds milk.	Pounds fat.	Months in milk.	Pounds milk.	Pounds fat.	Months in milk.	Pounds milk.	Pounds fat.
Pet	6	11	7,747	332.0						
Tips	6	11	8,568	329.3	11	8,728	348.8	10	8,758	340.9
Bertha	2	11	5,027	191.3	11	6,775	265.8	11	7,070	238.8
Limpty	3	11	5,918	227.8	7	4,977	191.0	10	8,119	328.1
Shorty	5	11	9,508	343.4	11	8,329	308.8	12	10,400	394.4
Reddy	7	11	7,663	351.2	10	5,691	275.8	11	7,466	326.2
Maud	8	8	5,526	180.5	Sold for bee f.					
Edna	7	10	5,801	250.4	11	7,329	340.3	8	4,954	211.6
Browney	9	10	6,107	212.5	6	6,147	217.6	Sold for bee f.		
Ruffy	4	11	6,487	239.5						
Bridget	3	11	4,859	246.2	11	5,437	272.4	Sold.		
Little Jersey	4	11	7,747	310.1	10	7,509	329.9	11	9,882	447.3
Shaver	3	11	7,056	259.1	11	9,261	341.7	10	10,144	372.5
Smokey	4	9	4,414	217.4	10	6,156	298.2	11	7,723	342.9
Lily	7	9	7,745	295.6	10	8,223	341.4	10	8,784	337.7
Bub	3	11	5,477	241.7						
Scary	8	6	4,001	148.6						
Wild Blue	7	8	6,033	211.7						
Baldehy	8	10	8,612	279.0	10	9,379	311.8	10	11,077	356.0
Diana	7	11	8,310	380.8	11	8,050	399.5	12	9,180	456.1
Old Blue	10	10	7,511	274.7	10	9,251	372.0	Killed.		
Brindle	3	10	5,673	240.1	8	5,734	220.1		8,889	365.5
Jennie	3	7	3,384	150.6						
Blackey	2	10	5,280	201.8						
Juno	7	8	4,788	235.6	10	5,867	288.1	Sold for bee f.		
Topsy	2	11	5,603	224.0						
Bob	7	11	8,623	318.6	9	7,552	276.4	10	10,785	395.9
Pansy	6	10	7,996	336.3	11	9,251	428.2	11	10,478	467.5
Longlegs	8	11	9,611	416.0	11	9,190	383.2	11	10,706	457.4
Fitz	7	11	9,683	406.2	11	8,280	333.6	12	11,605	471.8
Pete	7	11	8,526	272.0						
Shirt Thief	8	10	6,995	257.6						
Linie	6	11	8,527	304.0	12	9,167	329.1	11	10,258	358.3
Spikie	4	11	7,640	305.1	11	7,601	348.2	10	8,747	357.3
Seven	5	10	6,362	260.9	10	7,154	281.0	9	7,013	278.6
Tomy	6	10	6,233	290.2	6	4,570	196.6	Sold for bee f.		
Lonsy	7	7	4,256	152.4	Sold for bee f.					
Fanny	3	9	4,837	188.3	9	6,446	265.0	10	8,061	326.8
Old Jersey	10	9	5,075	222.3	9	5,404	230.8	9	6,322	250.8
Nora	3	9	7,237	247.7	10	9,339	334.6	10	10,995	386.9
Daisy	3	9	4,980	176.7						
Annie	3	11	5,038	188.4						
Buzzie	4	8	5,350	190.4						
Goldeka	9	7	3,293	168.4	11	6,445	334.7	9	5,918	293.6
Topsy (1910)	3				8	4,795	175.7	Sold for bee f.		
Soxie	2				8	5,647	214.0	12	9,887	352.5
Shanks	2				10	5,231	185.3	12	7,744	275.6
Beauty	2				10	5,577	247.0	11	7,866	342.5
Rosie	2				10	3,947	172.2	9	5,464	*218.6
Flora (1911)	?							12	7,649	309.3
Dandy	2							11	6,064	276.2
Burnelli	9							10	5,626	275.6
Polly	?							11	6,785	298.9
Amy	?							11	5,134	298.1
Dynamite	3							11	6,021	243.2
Little Katie	6							11	7,634	327.0
Stella	6							10	5,305	306.1
Average			6,480	256.3		7,013	290.0		8,181	335.7

*Sold for beef.

Of the original 44 cows in 1909, 29 were retained during 1910, and only 24 were retained during 1911.

APPENDIX.

I.

U. S. Weather Bureau Report of Rainfall, Eureka, Humboldt County, with Variation from Normal.

	1909.		1910.		1911.	
	Total for month.	Variation from normal.	Total for month.	Variation from normal.	Total for month.	Variation from normal.
January -----	14.41	+6.82	7.26	-0.33	8.63	+1.04
February -----	11.54	+4.82	7.34	-0.62	3.75	-2.97
March -----	2.72	-3.46	1.97	-4.21	1.45	-4.73
April -----	0.24	-4.04	0.83	-3.45	3.39	-0.89
May -----	0.76	-2.07	0.64	-2.19	3.52	+0.69
June -----	0.14	-1.04	0.49	-0.69	0.23	-0.95
July -----	0.55	+0.46	0.00	-0.09	0.00	-0.09
August -----	Trace	-0.14	0.00	-0.14	0.08	-0.06
September -----	0.61	-0.77	0.01	-1.37	0.29	-1.09
October -----	3.78	+0.88	0.82	-2.08	1.68	-1.22
November -----	12.60	+7.28	6.86	+1.54	2.09	-3.23
December -----	4.29	-2.99	3.43	-3.85	4.74	-2.54
Total -----	51.64	+5.75	29.65	-16.24	29.85	-16.04

II.

Contract of Ferndale Cow Testing Association.

WHEREAS, It is the desire of the undersigned dairymen of Humboldt County, California, to form an association, known as the Ferndale Cow Testing Association, for the purpose of testing the cows belonging to said dairymen; and

WHEREAS, It will be necessary that said association when formed draft by-laws, elect officers and directors, and hire a tester in order to do said testing; and

WHEREAS, In order to pay said tester, it will be necessary that the following rates be paid by the members of said association, to wit: For each member taking his own samples for testing, 80 cents per cow per year. All members having less than twenty cows tested must take their own samples. All members having fifty or more cows tested, who shall have samples taken by tester, shall pay 80 cents per cow per year. All members having less than fifty cows tested, who shall have samples taken by tester, shall pay \$1.00 per cow per year. The cows of each member are to be tested once each month for one year. The tester is to be hired and under the control of directors of said association, which directors shall have the management and control of its affairs, according to the judgment of the majority of members as expressed in the by-laws which may be adopted by said association.

Now, therefore, we, the undersigned, in consideration of the premises and of the mutual promises contained herein, do hereby agree with each other and with the several signers of any paper similar to this, and with said Ferndale Cow Testing Association, to pay to said Ferndale Cow Testing Association, quarterly in advance, the annual sums set opposite our respective names, said amount to be paid for one year's testing of the number of cows we hereby agree to have tested by said association, according to the foregoing rates; and in case any member should increase the number of cows he has tested by said association, he shall pay a proportionately higher amount per quarter in accordance with the foregoing schedule of rates. The first payment is to be made February 15, 1912, and the succeeding payments are to be made on the fifteenth days of May, August and November, 1912.

We further agree—

1. That the money collected shall be applied to paying the running expenses of said association: that the said association shall keep full and accurate books of account of the receipts and disbursements, and of all business of said association, and of the resolutions and orders of the directors: and the same shall be the property of the association, and shall be open at all times to the examination of the members and to each of them.

2. Each member of said association, in addition to the foregoing rates, shall furnish board and lodging for the tester for at least one day at each visit, and if necessary convey him to his next place of work. Said tester shall not work on Sundays but shall be entitled to board and lodging over Sunday at the place where he is working Saturday.

3. That we shall not be required to pay the sum subscribed by us unless the aggregate of our subscriptions and contributions to this object shall by the fifteenth day of February be equivalent to the assessments for 1200 cows.

Dated.	Signature.	Number of cows.	Take own samples? Yes or No.	Amount.
--------	------------	-----------------	---------------------------------	---------

III.

Contract of the Stanislaus Cow Testing Association.

We, the undersigned dairymen, in consideration of the periodical (one day each month) testing of our cows during the season of 1912 by -----, Secretary-Treasurer of the Stanislaus Cow Testing Association, hereby agree to pay the said -----, Secretary-Treasurer of the Stanislaus Cow Testing Association, the sum of one and one half (\$1.50) dollars for every cow so tested for us. We hereby agree to pay this sum per cow in three installments in advance; seventy-five cents per cow we will pay March 1, 1912; fifty cents per cow we

will pay June 1, 1912; and twenty-five cents per cow we will pay September 1, 1912.

We, the undersigned dairymen, further agree that we will pay the first installment of seventy-five cents when due on the number of cows set opposite our names; and that we will pay the fifty cent and twenty-five cent installments when due upon the number of cows set opposite our names and upon all other cows tested in like proportion. It is hereby understood that each member may be allowed to replace not to exceed one fifth of the original number of cows entered.

We, the undersigned dairymen, further agree to provide suitable board and lodging for the agent of the Stanislaus Cow Testing Association, and feed and stable for his horse, when said agent is actually engaged in testing our cows, including Sundays and holidays.

It is hereby understood that this contract is not binding unless seven hundred (700) cows have been entered by the first of March, 1912.

Dated.	Signature.	Number of cows.	Amount.
--------	------------	-----------------	---------

IV.

By-Laws of the Ferndale Cow Testing Association.

ARTICLE I.

The name of this association shall be the Ferndale Cow Testing Association.

ARTICLE II.

The purpose for which it is formed is generally to promote the dairy interests of its members and particularly to provide means and methods of improvement of dairy qualities of cows and for the testing of cows of the members not less than once a month.

ARTICLE III.

Its principal place of business shall be at Ferndale, California.

ARTICLE IV.

SECTION 1. The board of directors shall consist of seven members, of whom a majority shall constitute a quorum. They shall be elected annually to hold office for one year and until the election of their successors, the first election to be held on the tenth day of March, 1909, and subsequent elections to be held on the fifteenth day of February in each year, except when such day falls on Sunday, in which case the election shall be held on the Monday following.

SEC. 2. The board of directors shall have the management and

control of the business of the association, shall employ such agents and employees as they deem advisable, and shall fix the rates of compensation of all officers, agents, and employees.

SEC. 3. Vacancies in the board of directors, or offices, may be filled by a majority vote of the remaining members of the board. The person so elected shall serve for the remainder of the unexpired term.

ARTICLE V.

The annual meeting of the members of this association shall be held on the date above fixed for the election of directors, in Ferndale, California, at a place to be designated by the board of directors.

Special meetings of the members may be called by the president, or by the board of directors. Notice of all meetings of the members of the association, whether annual or special, should be given to the members by the secretary, by mailing to each member a written or printed notice thereof, at least five days prior to the date of said meeting.

ARTICLE VI.

The Board of Directors shall meet on the fifteenth day of each month, unless there shall be a resolution to determine upon a different date, at the town hall in Ferndale, California, at the hour of 1.30 p. m. Notice of such meeting shall be given by the secretary by mailing to each director a written or printed notice thereof, at least three days before date of said meeting.

ARTICLE VII.

SECTION 1. The officers of the association shall consist of a president, vice-president, and secretary-treasurer, who shall have the usual powers and perform the customary duties incident to these offices. The office of secretary-treasurer shall be held by one person who, besides performing the usual duties appertaining to the offices of secretary and treasurer, shall keep in a permanent form, subject to the direction of the board of directors, the cow testing records of members of the association: and who shall be authorized to receive all moneys due the association, and to pay any indebtedness of the association, and in general to transact all routine and other business of the association subject to the direction of the board of directors.

SEC. 2. The officers shall be elected by the board of directors from among their number, the election to be held immediately subsequent to the annual meeting of the members.

ARTICLE VIII.

Election of officers shall be by ballot, each member being entitled to cast only one vote for each of the seven directors to be elected; *provided, however*, that each member making payment to the association of testing charges on more than twenty cows, shall be entitled to an additional vote (for the full number of directors to be elected) for each additional twenty cows so paid for by him. Any member unable to be present at any meeting of the association may be represented by any one interested in the management of the dairy of the member.

ARTICLE IX.

Any dairyman entering into an agreement with the officers of the association binding him to pay the testing charges for one year on the cows owned by him shall, subject to the approval of the board of directors, be considered a member of the association. Failure to make any payments agreed on as testing charges shall make a delinquent member liable to suspension which may be imposed by the board of directors in such case at their option.

ARTICLE X.

These by-laws may be amended, added to or altered, by a majority vote of all members present at the annual meeting or at a special meeting called for the purpose, each member in such case being entitled to one vote only.

V.

Testing Outfit Ordered by the Stanislaus Cow Testing Association.

1 24-bottle Twentieth Century tester.....	\$23 40
6 dozen 6" 10 per cent bottles at \$1.50.....	9 00
2 dozen 17.6 c.c. pipettes at \$1.50.....	3 00
$\frac{1}{2}$ dozen 17.5 acid measure.....	60
$\frac{1}{2}$ dozen O. B. skim milk bottles.....	2 80
2 pair dividers	45
1 dozen milk test bottle brushes.....	30
1 60-pound automatic scale	5 00
1 piece galvanized iron with holes for utility bath.....	50
1 carboy clear acid about.....	3 50
1 utility bath, 24 6-inch bottles.....	1 35
8 dozen 2-oz. aluminum screw top sample bottles.....	3 00
$\frac{1}{2}$ dozen brushes for same.....	60
3 feet 3/16" tubing pinch cock and pipette.....	50
1 oil stove	2 00
1 copper kettle with nipple and tubing attachment.....	2 15
2 glass stopper bottles for acid.....	50
1 coal oil can	25
Total	\$58.90

(The last four items were bought at local store.)

VI.

Testing Apparatus, Ferndale Association.

- 1 24-bottle hand Babcock tester.
- 4 dozen Babcock milk test bottles.
- 3 pipettes.
- 2 skim milk test bottles.
- 2 acid measures and 1 acid glass.
- 3 spring balances with adjustable pointers.
- 3 sampling dippers.
- 12 dozen sample bottles, each $6\frac{1}{2}$ inches high by $1\frac{1}{2}$ inches inside diameter, cork stopper.
- 6 boxes each of size to hold 2 dozen sample bottles.
- 2 test bottle blocks, each with holes to accommodate 2 dozen bottles in two rows.
- 1 board with 24 holes of size to fit over necks of test bottles in above block, used in emptying bottles after test.
- 1 gasoline stove, same as used by plumber.
- 2 copper kettles with faucets to attach $\frac{3}{16}$ " rubber tubing.
- 1 milk pail for weighing milk. Sample and test bottles, brushes, sulfuric acid, gasoline, washing powder, oil, $\frac{3}{16}$ inch rubber hose with pinch cock and pipette tip, water dipper, and milk preserving tablets.

STATION PUBLICATIONS AVAILABLE FOR DISTRIBUTION.

REPORTS.

1896. Report of the Viticultural Work during the seasons 1887-93, with data regarding the Vintages of 1894-95.
1897. Resistant Vines, their Selection, Adaptation, and Grafting. Appendix to Viticultural Report for 1896.
1902. Report of the Agricultural Experiment Station for 1898-1901.
1903. Report of the Agricultural Experiment Station for 1901-03.
1904. Twenty-second Report of the Agricultural Experiment Station for 1903-04.

BULLETINS.

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| <ol style="list-style-type: none">No. 128. Nature, Value, and Utilization of Alkali Lands, and Tolerance of Alkali. (Revised and Reprint, 1905.)133. Tolerance of Alkali by Various Cultures.147. Culture work at the Sub-stations.162. Commercial Fertilizers. (Dec. 1, 1904.)164. Poultry Feeding and Proprietary Foods.167. Manufacture of Dry Wines in Hot Countries.168. Observations on Some Vine Diseases in Sonoma County.169. Tolerance of the Sugar Beet for Alkali.170. Studies in Grasshopper Control.171. Commercial Fertilizers. (June 30, 1905.)174. A New Wine-cooling Machine.176. Sugar Beets in the San Joaquin Valley.177. A New Method of Making Dry Red Wine.178. Mosquito Control.179. Commercial Fertilizers. (June, 1906.)181. The Selection of Seed-Wheat.182. Analysis of Paris Green and Lead Arsenic. Proposed Insecticide Law.183. The California Tussock-moth.184. Report of the Plant Pathologist to July 1, 1906.185. Report of Progress in Cereal Investigations.186. The Oidium of the Vine.187. Commercial Fertilizers. (January, 1907.)188. Lining of Ditches and Reservoirs to Prevent Seepage and Losses.189. Commercial Fertilizers. (June, 1907.)191. California Peach Blight.192. Insects Injurious to the Vine in California.193. The Best Wine Grapes for California; Pruning Young Vines; Pruning the Sultanina.194. Commercial Fertilizers. (Dec., 1907.)195. The California Grape Root-worm. | <ol style="list-style-type: none">No. 197. Grape Culture in California; Improved Methods of Wine-making; Yeast from California Grapes.198. The Grape Leaf-Hopper.199. Bovine Tuberculosis.201. Commercial Fertilizers. (June, 1908.)202. Commercial Fertilizers. (December, 1908.)203. Report of the Plant Pathologist to July 1, 1909.204. The Dairy Cow's Record and the Stable.205. Commercial Fertilizers. (December, 1909.)206. Commercial Fertilizers. (June, 1910.)207. The Control of the Argentine Ant.208. The Late Blight of Celery.209. The Cream Supply.210. Imperial Valley Settlers' Crop Manual.211. How to Increase the Yield of Wheat in California.212. California White Wheats.213. The Principles of Wine-making.214. Citrus Fruit Insects.215. The House Fly in its Relation to Public Health.216. A Progress Report upon Soil and Climatic Factors Influencing the Composition of Wheat.217. Honey Plants of California.218. California Plant Diseases.219. Report of Live Stock Conditions in Imperial County, California.220. Fumigation Studies No. 5; Dosage Tables.221. Commercial Fertilizers. (Oct. 1911.)222. The Red or Orange Scale.223. The Black Scale.224. The Production of the Lima Bean.225. Tolerance of Eucalyptus for Alkali.226. The Purple Scale.227. Grape Vinegar.228. Pear Thrips and Peach Tree Borer.229. Hog Cholera and Preventive Serum.230. Enological Investigations.231. Walnut Culture in California. Walnut Blight. |
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| <p>No. 1. Texas Fever.
 7. Remedies for Insects.
 9. Asparagus Rust.
 11. Fumigation Practice.
 29. Preliminary Announcement Concerning Instruction in Practical Agriculture upon the University Farm, Davis, Cal.
 46. Suggestions for Garden Work in California Schools.
 52. Information for Students Concerning the College of Agriculture.
 55. Farmers' Institutes and University Extension in Agriculture.
 60. Butter Scoring Contest, 1910.
 61. University Farm School.
 62. The School Garden in the Course of Study.</p> | <p>No. 63. How to Make an Observation Hive.
 65. The California Insecticide Law.
 66. Insecticides and Insect Control.
 67. Development of Secondary School Agriculture in California.
 68. The Prevention of Hog Cholera.
 69. The Extermination of Morning-Glory.
 70. Observations on the Status of Corn-growing in California.
 74. Rice.
 75. A New Leakage Gauge.
 76. Hot Room Callusing.
 77. University Farm School.
 78. Announcement of Farmers' Short Courses for 1912.
 79. List of Insecticide Dealers.</p> |
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